

WHAT IS CLAIMED IS:

1. A method for determining a status associated with a memory system, the memory system including a plurality of spare units of erase, the method comprising:

5 updating a counter, the counter being arranged to be updated each time a spare unit of erase of the plurality of spare units of erase is reassigned, wherein the counter indicates a number of spare units of erase remaining in the plurality of spare units of erase;

10 comparing the counter to a threshold value, the threshold value being indicative of a number of spare units of erase of the plurality of spare units of erase which are yet to be reassigned in order for the memory system to be considered as reliable; and

generating an indication when comparing the counter to the threshold value yields a first result, wherein the indication is arranged to indicate that the memory system is substantially near a failure condition.

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2. The method of claim 1, wherein updating the counter includes decrementing the counter each time a spare unit of erase of the plurality of spare units of erase is reassigned.

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3. The method of claim 1 wherein comparing the counter to the threshold value includes determining when a value of the counter is less than or equal to the threshold value.

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4. The method of claim 3 wherein the first result is arranged to indicate that the value of the counter is less than or equal to the threshold value.

5. The method of claim 1 further including:

attempting to write data to a first unit of erase;  
determining when the first unit of erase is worn;

reassigning a first spare unit of erase included in the plurality of spare units of erase as the first unit of erase when it is determined that the first unit of erase is worn, wherein updating the counter includes updating the counter to indicate that the first spare unit of erase is reassigned; and

5 writing the data to the reassigned first spare unit of erase.

6. A memory system for storing information, the memory system comprising:  
a plurality of units of erase;  
a plurality of spare units of erase;

10 a first storage element, the first storage element being arranged to contain a counter and a threshold, the counter being arranged to indicate a number of spare units of erase included in the plurality of spare units of erase, the threshold being arranged to indicate a number of spare units of erase which are not to be reassigned; and

15 a controller, the controller being arranged to update the counter each time a spare unit of erase of the plurality of spare units of erase is reassigned, wherein the counter indicates a number of spare units of erase included in the plurality of spare units of erase which have not yet been reassigned, the controller further being arranged to compare the counter to the threshold value to determine if the memory system is substantially near a condition, the condition being arranged to characterize the memory system as being

20 substantially unreliable.

7. The memory system of claim 6 wherein when the controller compares the counter to the threshold value to determine if the memory system is substantially near the condition, the controller determines when a value of the counter is less than or equal to the threshold value.

8. The memory system of claim 7 wherein when it is determined that the value of the counter is less than or equal to the threshold value, the controller generates an indication that the memory system is substantially near the condition.

9. The memory system of claim 6 wherein the controller is still further arranged to attempt to write data to a first unit of erase included in the plurality of units of erase, and to determine if the first unit of erase is worn.

5 10. The memory system of claim 9 wherein when it is determined that the first unit of erase is worn, the controller reassigns a first spare unit of erase included in the plurality of spare units of erase as the first unit of erase.

10 11. The memory system of claim 10 wherein the controller is still further arranged to write the data into the reassigned first spare unit of erase.

12. The memory system of claim 6 wherein the controller is still further arranged to attempt to write data to a first unit of erase included in the plurality of units of erase, and to determine if the first unit of erase is defective

15 13. The memory system of claim 12 wherein when it is determined that the first unit of erase is defective, the controller reassigns a first spare unit of erase included in the plurality of spare units of erase as the first unit of erase.

20 14. The memory system of claim 13 wherein the controller is still further arranged to write the data into the reassigned first spare unit of erase.

25 15. The memory system of claim 6 wherein the plurality of units of erase are a plurality of sectors, and the plurality of spare units of erase are a plurality of spare sectors.

16. The memory system of claim 6 further including:  
a non-volatile memory, wherein the plurality of units of erase, the plurality of spare units of erase, and the first storage element are included in the non-volatile  
30 memory.

17. The memory system of claim 16 wherein the memory system is a non-volatile memory system.

5 18. The memory system of claim 17 wherein the memory system is arranged to operate in conjunction with a host system.

10 19. The memory system of claim 18 wherein the controller is arranged to reassign a spare unit of erase included in the plurality of spare units of erase in response to a request from the host system.

15 20. The memory system of claim 6 wherein the memory system is one of a PC card, a CompactFlash card, a MultiMedia Card, a SmartMedia card, a Memory Stick card, and a Secure Digital card.

21. A system, comprising:

a host system;

a memory system, the memory system being arranged to interface with the host system, the memory system including,

20 a plurality of units of erase,

a plurality of spare units of erase, and

25 a first storage element, the first storage element being arranged to contain a counter and a threshold, the counter being arranged to indicate a number of spare units of erase included in the plurality of spare units of erase, the threshold being arranged to indicate a number of spare units of erase which are not to be reassigned; and

30 a controller, the controller being arranged to update the counter each time a spare unit of erase of the plurality of spare units of erase is reassigned, wherein the counter indicates a number of spare units of erase included in the plurality of spare units of erase which have yet to be reassigned, the controller further being arranged to compare the

counter to the threshold value to determine if the memory system is substantially near a condition, the condition being arranged to characterize the memory system as being substantially unreliable.

- 5      22.     The system of claim 21 wherein when the controller is included in the memory system and is arranged to compare the counter to the threshold value to determine if the memory system is substantially near the condition, the controller determines when a value of the counter is less than or equal to the threshold value.
- 10     23.     The system of claim 22 wherein when it is determined that the value of the counter is less than or equal to the threshold value, the controller generates an indication that the memory system is substantially near the condition.
- 15     24.     The system of claim 21 wherein the host system is arranged to request that data be written to the memory system, and the controller is included in the memory system, the controller further being arranged to attempt to write the data to a first unit of erase included in the plurality of units of erase in response to the request, and to determine if the first unit of erase is worn.
- 20     25.     The system of claim 24 wherein when it is determined that the first unit of erase is worn, the controller reassigns a first spare unit of erase included in the plurality of spare units of erase as the first unit of erase and writes the data into the reassigned first spare unit of erase.
- 25     26.     The system of claim 21 wherein the host system is arranged to request that data be written to the memory system, and the controller is included in the memory system, the controller further being arranged to attempt to write the data to a first unit of erase included in the plurality of units of erase in response to the request, and to determine if the first unit of erase is defective.

27. The system of claim 26 wherein when it is determined that the first unit of erase is defective, the controller reassigns a first spare unit of erase included in the plurality of spare units of erase as the first unit of erase and writes the data into the reassigned first spare unit of erase.

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28. The system of claim 21 wherein the plurality of units of erase are a plurality of sectors, and the plurality of spare units of erase are a plurality of spare sectors.

29. The system of claim 21 wherein the memory system is a memory card.

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30. The system of claim 29 wherein the memory card is one selected from the group consisting of a PC card, a CompactFlash card, a MultiMedia card, a Smart Media card, a Memory Stick card, and a Secure Digital card.

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31. The system of claim 21 wherein the host system is arranged to capture information and to attempt to store the information in the memory system.

32. The system of claim 31 wherein the information is one of still image information, audio information, video image information, and wireless information.

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33. The system of claim 32 wherein the host system is one of a digital camera, a video camera, a cellular communications device, an audio player, and a video player.

34. A memory system for storing information, the memory system comprising:

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a plurality of spare units of erase;

means for storing a counter;

means for storing a threshold;

means for reassigning a spare unit of erase of the plurality of spare units of erase;

means for updating the counter, the counter being arranged to be updated each

30 time a spare unit of erase of the plurality of spare units of erase is reassigned, wherein the

counter indicates a number of spare units of erase remaining in the plurality of spare units of erase;

means for comparing the counter to the threshold value, the threshold value being indicative of a number of spare units of erase of the plurality of spare units of erase which  
5 are yet to be reassigned in order for the memory system to be considered as useable; and

means for generating an indication when comparing the counter to the threshold value yields a first result, wherein the indication is arranged to indicate that the memory system is substantially near a failure condition.

10 35. The memory system of claim 34, wherein the means for updating the counter include means for decrementing the counter each time a spare unit of erase of the plurality of spare units of erase is reassigned.

15 36. The memory system of claim 34 wherein the means for comparing the counter to the threshold value include means for determining when a value of the counter is less than or equal to the threshold value.

20 37. The memory system of claim 36 wherein the first result is arranged to indicate that the value of the counter is less than or equal to the threshold value.

25 38. The memory system of claim 24 further including:  
means for attempting to write data to a first unit of erase;  
means for determining when the first unit of erase is worn, wherein the means for reassigned the unit of erase include means for reassigned a first spare unit of erase included in the plurality of spare units of erase as the first unit of erase when it is determined that the first unit of erase is worn, and wherein the means for updating the counter include means for updating the counter to indicate that the first spare unit of erase is reassigned; and  
means for writing the data to the reassigned first spare unit of erase.

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39. A method for determining a status associated with a non-volatile memory system, the non-volatile memory system including a plurality of spare units of erase, the method comprising:

automatically determining when the non-volatile memory system is nearing a condition which renders the non-volatile memory system as being substantially unreliable; and

generating an indication when it is determined that the non-volatile system is nearing the condition which renders the non-volatile memory system as being substantially unreliable, wherein the indication is arranged to indicate that the non-volatile system is nearing the condition which renders the non-volatile memory system as being substantially unreliable.

40. The method of claim 34 further including:  
saving the indication.

41. The method of claim 39 wherein automatically determining when the non-volatile memory system is nearing a condition which renders the non-volatile memory system as being substantially unreliable includes:

updating a counter, the counter being arranged to be updated each time a spare unit of erase of the plurality of spare units of erase is reassigned, wherein the counter indicates a number of spare units of erase remaining in the plurality of spare units of erase; and

comparing the counter to a threshold value, the threshold value being indicative of a number of spare units of erase of the plurality of spare units of erase which are not to be reassigned in order for the memory system to be considered as useable.

42. The method of claim 41 wherein generating the indication when it is determined the non-volatile system is nearing the condition which renders the non-volatile memory system as being substantially unreliable includes:

determining when comparing the counter to the threshold value yields a first result, wherein the indication is arranged to indicate that the memory system is nearing the condition which renders the non-volatile memory systems as being substantially unreliable when comparing the counter to the threshold value yields the first result.

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43. The method of claim 39 wherein the condition which renders the non-volatile memory systems as being substantially unreliable when comparing the counter to the threshold value yields the first result is one of an end-of-life condition and a fault condition.

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44. A non-volatile memory system for storing information, the non-volatile memory system comprising:

a plurality of spare units of erase;

means for automatically determining when the non-volatile memory system is nearing a condition which renders the non-volatile memory system as being substantially unreliable; and

means for generating an indication when it is determined that the non-volatile system is nearing the condition which renders the non-volatile memory system as being substantially unreliable, wherein the indication is arranged to indicate that the non-volatile system is nearing the condition which renders the non-volatile memory system as being substantially unreliable.

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45. The non-volatile memory system of claim 44 wherein the means for automatically determining when the non-volatile memory system is nearing a condition which renders the non-volatile memory system as being substantially unreliable include:

means for updating a counter, the counter being arranged to be updated each time a spare unit of erase of the plurality of spare units of erase is reassigned, wherein the counter indicates a number of spare units of erase remaining in the plurality of spare units of erase; and

means for comparing the counter to a threshold value, the threshold value being indicative of a number of spare units of erase of the plurality of spare units of erase which are not to be reassigned in order for the memory system to be considered as useable.

- 5    46. The non-volatile memory system of claim 45 wherein the means for generating the indication when it is determined the non-volatile system is nearing the condition which renders the non-volatile memory system as being substantially unreliable include:

10      means for determining when the means for comparing the counter to the threshold value yields a first result, wherein the indication is arranged to indicate that the memory system is nearing the condition which renders the non-volatile memory systems as being substantially unreliable when the means for comparing the counter to the threshold value yields the first result.

- 15      47. The non-volatile memory system of claim 45 wherein the non-volatile memory system is one of a PC card, a CompactFlash card, a MultiMedia card, a Memory Stick card, a Smart Media card, and a Secure Digital card.